IN THE CLAIMS:

The following is a listing of the claims in this application and their status:

Claims 1-32 (canceled)

33. (currently amended): A method for assaying and screening for a biological target species which comprises:

a) functionalizing a magnetically active nucleus by incorporating said nucleus into a ~~macromolucular~~ macromolecular or molecular complex that is capable of binding the target species;

b) bringing said macromolecular or molecular complex into contact with the target species; and

c) detecting the occurrence of or change in the nuclear magnetic resonance signal from said functionalized nucleus in order to:

i) monitor the occurrence of binding between said macromolecular or molecular complex and said target species and/or

ii) monitor a subsequent change in the environment of the target species after said binding occurs.

34. (original): The method according to Claim 33, wherein said binding to said target species is either *in vivo* or *in vitro.*

35. (original): The method according to Claim 33, wherein said macromolecule or molecular complex includes a structure selected from a group consisting of monoclonal antibodies, dendrimers, self-assembled lipid complexes, liposomes, cyclodextrins, cryptands, cryptophanes, carcerands, microbubbles, micelles, vesicles, fullerenes, and molecular cage structures.

36. (original): The method according to Claim 33, wherein said macromolecular molecular complex includes a magnetically active gas contained within a molecular carrier.

37. (original): The method according to Claim 36, wherein said magnetically active gas is selected from a group consisting of hyperpolarized xenon, sulfur hexafluoride, and hyperpolarized helium.

38. (original): The method according to Claim 33, wherein said magnetically active gas is selected from a group consisting of hyperpolarized xenon, sulfur hexafluoride, hyperpolarized helium.

39. (original): The method according to Claim 33, wherein said monitoring comprises detecting the occurrence of or change in a magnetic resonance signal with a unique magnetic resonance property.

40. (original): The method according to Claim 39, wherein said magnetic resonance property is selected from a group consisting of chemical shifts and relaxation times.

41. (original): The method according to Claim 33, wherein said change in environment of the biomolecular target comprises a change in pH, ion concentration, or concentration of other molecules near said target species.

Claims 42-50 (canceled)

51. (original): A biosensor, comprising:

a) an environment targeting agent having an attraction affinity to a chemical environment; and

b) an active-nucleus carried by said environment targeting agent, wherein said environment targeting agent is capable of recognizing a change in said chemical environment and a detectable signal from said active-nucleus indicates said change in said chemical environment.

52. (original): A biosensor according to Claim 51, wherein said environment targeting agent comprises an active-nucleus binding region for carrying said active-nucleus and

an environment recognition region, wherein said active-nucleus binding region is selected from a group consisting essentially of monoclonal antibodies, dendrimers, self-assembled lipid complexes, liposomes, cyclodextrins, cryptands, carcerands, microbubbles, micelles, vesicles, fullerenes, and general molecular cage structures.

53. (original): A biosensor according to Claim 51, wherein said active-nucleus is selected from a group consisting essentially of hyperpolarized xenon, sulfur hexafluoride, and hyperpolarized helium.

54. (original): A biosensor according to Claim 51, wherein recognition of said chemical environment by said environment targeting agent produces a detectable chemical shift from said active-nucleus.

55. (original): A biosensor according to Claim 51, wherein recognition of said chemical environment by said environment targeting agent produces a magnetic resonance signal.

56. (original): A biosensor according to Claim 51, wherein said change in said chemical environment is selected from a group consisting of ion channel functioning, neuron functioning, ion binding and transport, and oxygen distribution.

Claims 57-72 (canceled)